

# PREDICTIVE POLICING

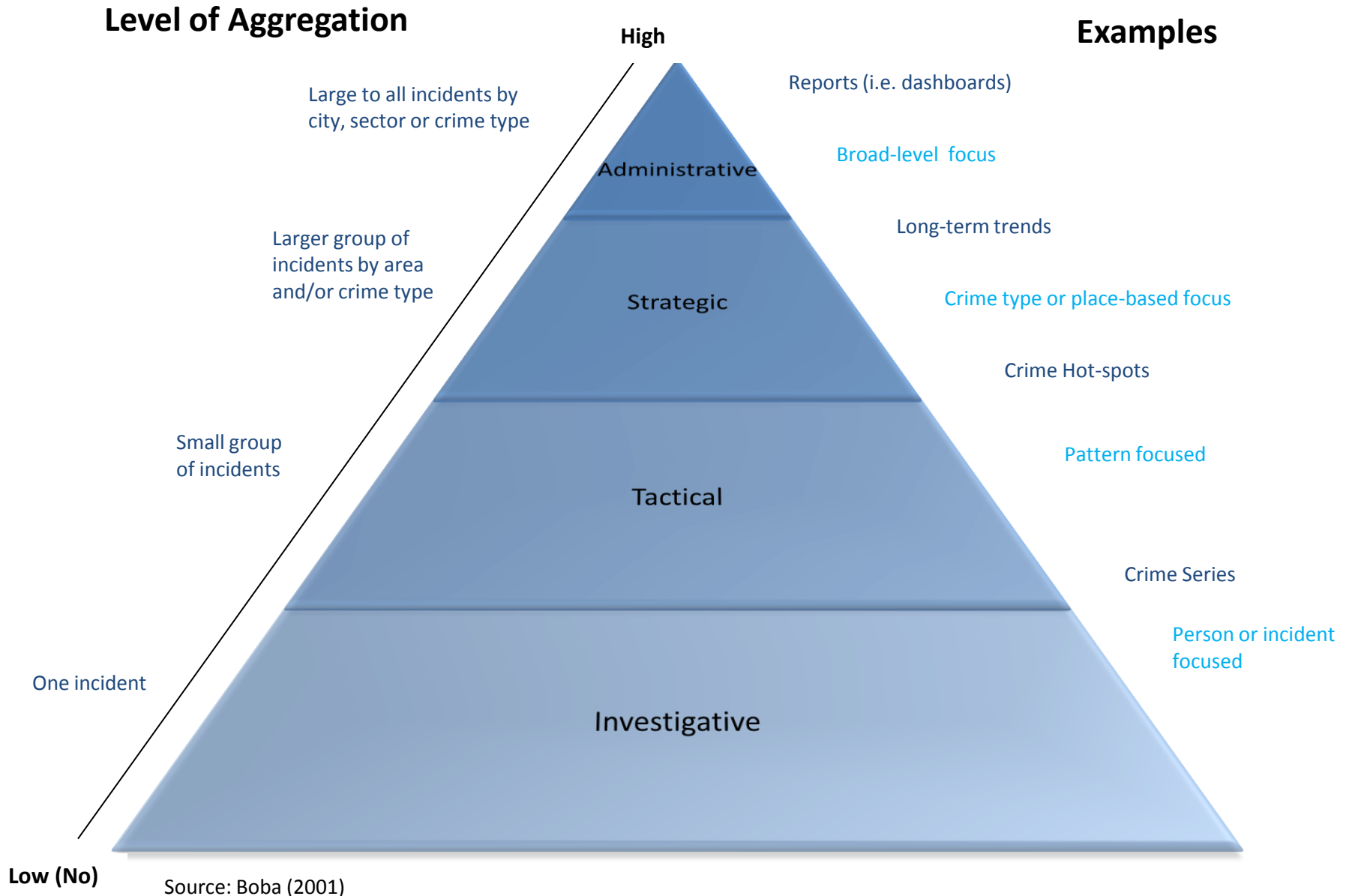


Tacoma Police Department

# Predictive Policing

- No standard definition
- Paradigm
- Similar to weather forecasting
- Not Minority Report

# Types of Crime Analysis



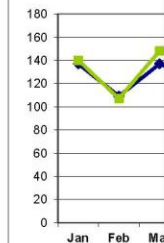
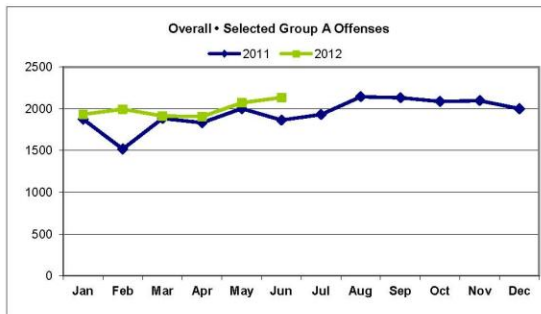
Administrative  
Strategic  
Tactical  
Investigative



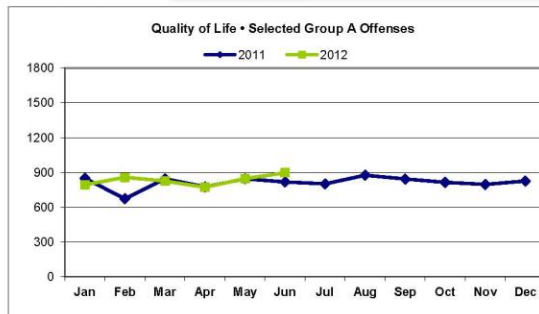
2010 Population: 198,397  
2011 Population: 198,900  
Population (2010 Census)  
Population (Crime in Washington 2011)

## Tacoma PD Strategic Dash

for June 2012



Note: Y-Axis Scale is not the same on every chart. DO NOT COMPARE. Not U



Select Violent Crime - Assault (Agg) includes Intimidation w/Weapon, Homicide, Robbery, and Sex Offenses (Forcible)  
Select Property Crime - Burglary, Larceny/Theft, and Motor Vehicle Theft  
Select Quality of Life Crime - Assault (Simple and Intimidation), Destruction/Damage/Vandalism of Property, Drugs/Narcotics, Prostitution and Weapons Law Violations



## Tacoma PD Strategic Dashboard

for June 2012

2010 Population: 198,397  
2011 Population: 198,900  
Population (2010 Census)  
Population (Crime in Washington 2011)

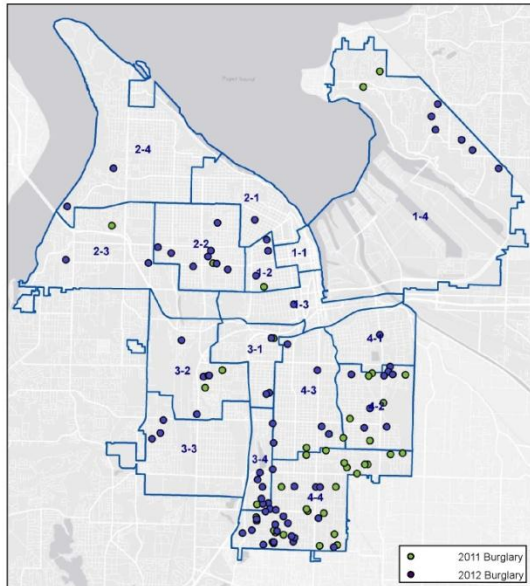
### Crime Snapshot

| Selected Group A Offenses                                | Jun 2011        | Jun 2012        | % Chg         | 2011 YTD        | 2012 YTD        | % Chg         |
|--|-----------------|-----------------|---------------|-----------------|-----------------|---------------|
| <b>Violent Crime</b>                                     | 126             | 124             | -1.6%         | 787             | 784             | -0.4%         |
| Crime Rate per 1000                                      | 0.6             | 0.6             | -1.3%         | 4.0             | 4.0             | -0.1%         |
| <b>Property Crime</b>                                    | 919             | 1114            | 21.2%         | 5384            | 6178            | 14.7%         |
| Crime Rate per 1000                                      | 4.6             | 5.6             | 21.5%         | 27.1            | 31.1            | 15.0%         |
| <b>Quality of Life</b>                                   | 817             | 896             | 9.7%          | 4798            | 4987            | 3.9%          |
| Crime Rate per 1000                                      | 4.1             | 4.5             | 9.9%          | 24.1            | 25.1            | 4.2%          |
| <b>Selected Group A Offenses Total</b>                   | <b>1862</b>     | <b>2134</b>     | <b>14.6%</b>  | <b>10969</b>    | <b>11949</b>    | <b>8.9%</b>   |
| Crime Rate per 1000                                      | 9.4             | 10.8            | 14.9%         | 55.1            | 60.2            | 9.2%          |
| <b>Calls for Service</b>                                 | <b>Jun 2011</b> | <b>Jun 2012</b> | <b>% Chg</b>  | <b>2011 YTD</b> | <b>2012 YTD</b> | <b>% Chg</b>  |
| <b>Non Self-Initiated Calls with TPD as Primary Unit</b> | 5679            | 6192            | 9.0%          | 31491           | 33313           | 5.8%          |
| Call Rate per 1000                                       | 28.6            | 31.2            | 9.3%          | 158.3           | 167.9           | 6.1%          |
| <b>Self-Initiated with TPD as Primary Unit</b>           | 5207            | 3752            | -27.9%        | 28535           | 23168           | -18.8%        |
| Call Rate per 1000                                       | 26.2            | 18.9            | -27.8%        | 143.5           | 116.8           | -18.6%        |
| <b>Jail</b>  | <b>Jun 2011</b> | <b>Jun 2012</b> | <b>% Chg</b>  | <b>2011 YTD</b> | <b>2012 YTD</b> | <b>% Chg</b>  |
| Booked & Released (SIPED)                                | 31              | 25              | -19.4%        | 185             | 161             | -13.0%        |
| Booked & Kept  | 455             | 396             | -13.0%        | 2789            | 2404            | -13.8%        |
| <b>Total Bookings</b>                                    | <b>486</b>      | <b>421</b>      | <b>-13.4%</b> | <b>2974</b>     | <b>2565</b>     | <b>-13.8%</b> |
| <b>Active Warrants Served</b>                            | <b>Jun 2011</b> | <b>Jun 2012</b> | <b>% Chg</b>  | <b>2011 YTD</b> | <b>2012 YTD</b> | <b>% Chg</b>  |
| Arrestees  | 237             | 237             | 0.0%          | 1484            | 1286            | -13.3%        |
| Total No of Outstanding Warrants for Arrestees           | 338             | 336             | -0.6%         | 2069            | 1844            | -10.9%        |

- Not UCR or ICR Compliant. Do not compare to any data using UCR or ICR standards.
- Crime data is based on the report date
- NC - Not Calculable
- Select Violent Crime - Assault (Agg) which includes Intimidation w/Weapon, Homicide, Robbery, and Sex Offenses (Forcible)
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- Select Quality of Life Crime - Assault (Simple and Intimidation), Destruction/Damage/Vandalism of Property, Drugs/Narcotics, Prostitution and Weapons Law Violations

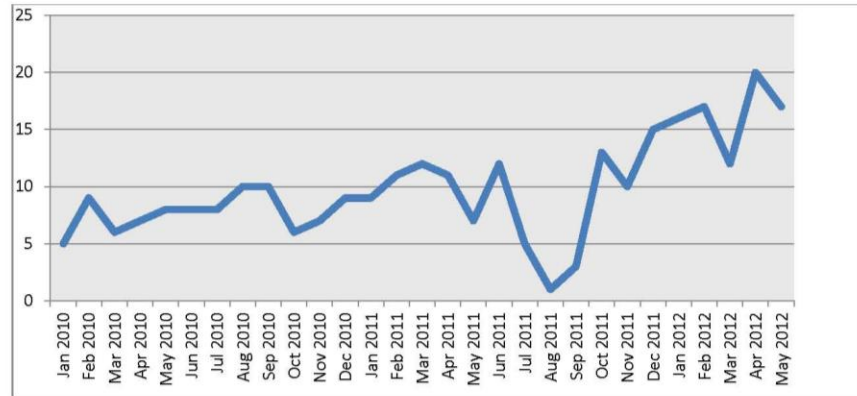
# Administrative Strategic Tactical Investigative

Asian Burglary Victims 01 Oct 2011- 31 May 2012



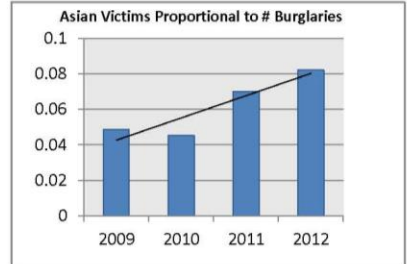
## Asian Victims - Burglary Trend - 2012

There has been an upward trend of Asian residents being burglarized since October 2011 through 01 June 2012.

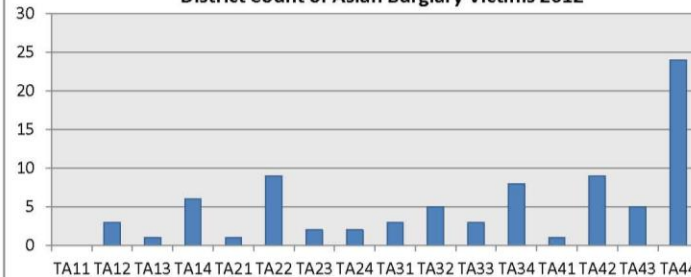


The increase in Asian burglary victims not solely due to increase in burglaries; the proportion of Asian victims to the total number of burglaries also increased through 01 June 2012.

| Year  | Non-Asian/MultiRace | Asian | Total | Asian Proportion |
|-------|---------------------|-------|-------|------------------|
| 2009  | 2018                | 103   | 2121  | 0.048561999      |
| 2010  | 1962                | 93    | 2055  | 0.045255474      |
| 2011  | 1447                | 109   | 1556  | 0.070051414      |
| 2012* | 917                 | 82    | 999   | 0.082082082      |



District Count of Asian Burglary Victims 2012



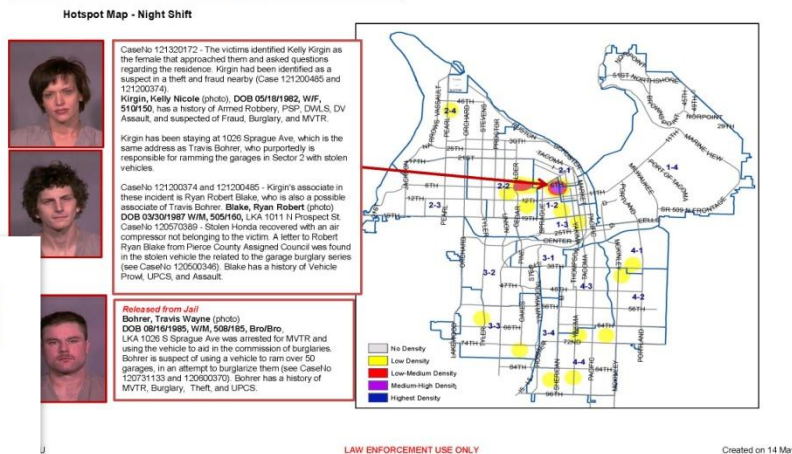
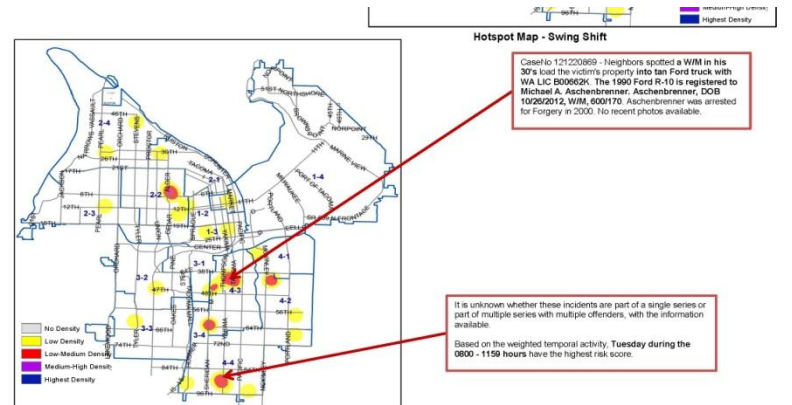
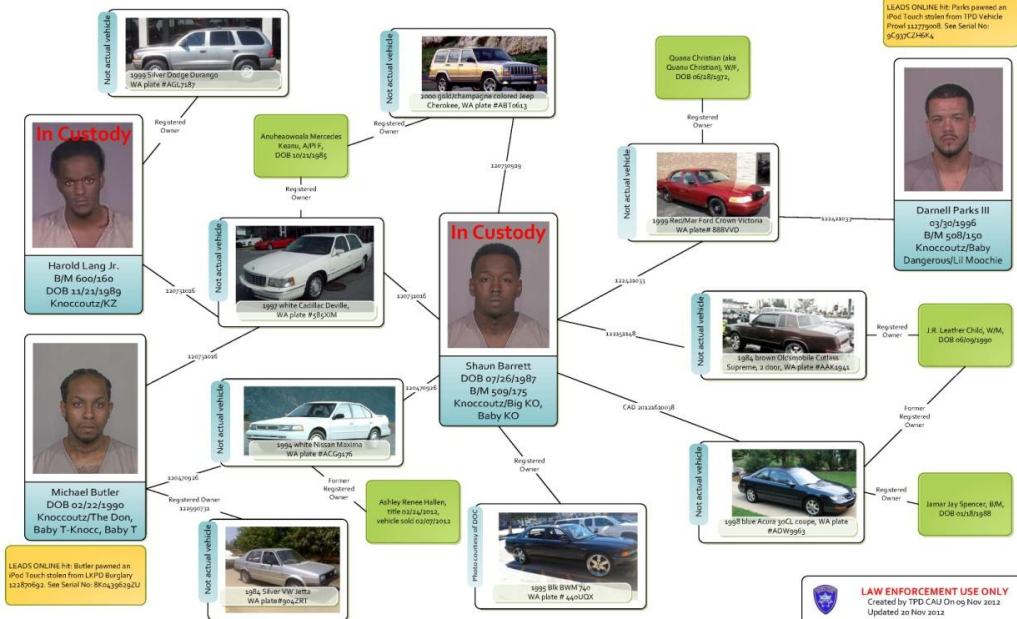
TA44 has the highest number of Asian burglary victims through 01 June 2012.

Only incidents where race field populated with Asian/Pacific Islander code included in analysis. Incidents with Asian victims among non-Asian victim households were excluded. DV-related incidents excluded.



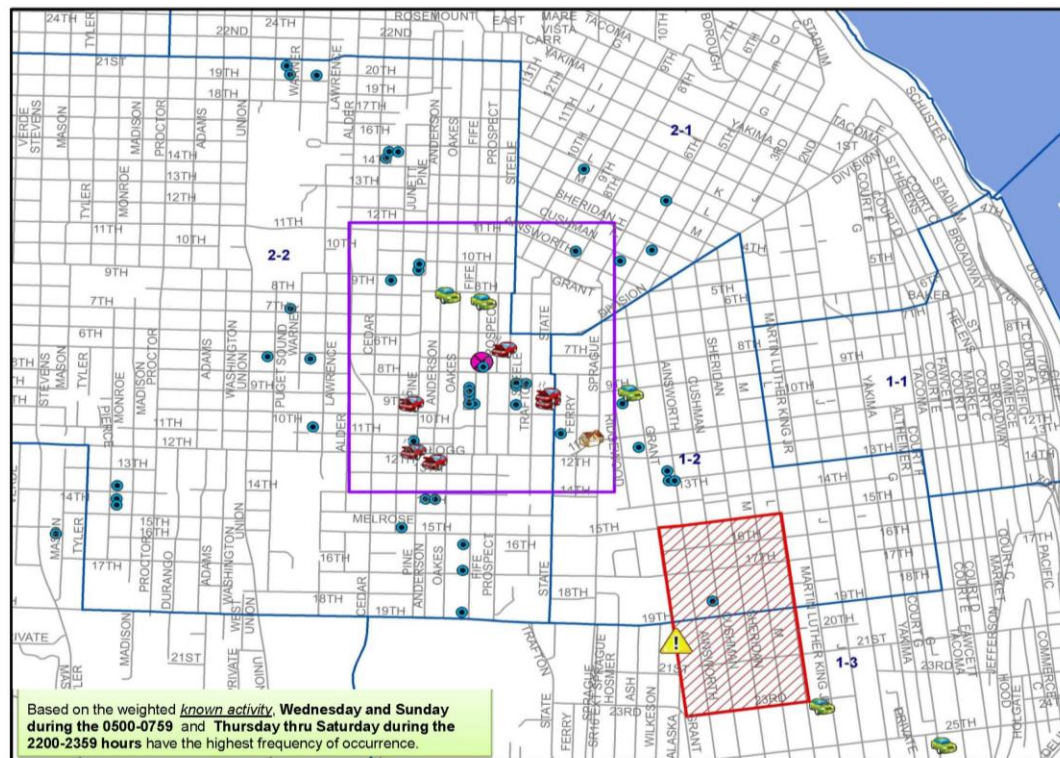
Administrative  
Strategic  
Tactical  
Investigative

### Shaun Barrett Associated Vehicles 2012





### Rammed Garage Burglary Incidents with related MVTR incidents and Spatial Statistics



There have been at least 48 incidents where the garage bay doors have been rammed with a vehicle since the end of January.

It appears the suspect is using stolen early -90s model vehicles to ram garage doors, in an attempt to gain entry (see table on previous page).

After officers identified a potential suspect, Detective Tschuschner interviewed the individual, who was booked on an unrelated warrant and a possibly related theft charge (see below).

### Possible Suspect

Bohrer, Travis Wayne (photo)  
DOB 08/16/1985, W/M, 508/185, Bro/Bro,  
LKA 1026 S Sprague Ave, is a possible person of  
interest in the garage burglary series (see  
CaseNo 120600370). Bohrer has a history of  
MVTR, Burglary, Theft, and UPCS.  
**INFORMATION ONLY - No PC**  
Contact Det. Tscheuschner (300) x 5501



### Possible Associate








Waggner, William Rapon (photo)  
DOB 07/28/1986 W/M, 600/150 Bro/Bro,  
LKA 704 S Sprague Ave #4, was identified by a  
latent print in a MVTR related to the garage  
burglary series (see CaseNo 120500346).  
Wagner has a history of UDCS, UPCS, and DV-  
Theft.



### Possible Associate

**Blake, Ryan Robert (photo)**  
DOB 03/30/1987 W/M, 505/160 Bro/Bro,  
LKA 1011 N Prospect St, Transient, CaseNo  
120570389 - Stolen Honda recovered with an  
air compressor not belonging to the victim. A  
letter to Robert Ryan Blake from Pierce County  
Assigned Council was found in the stolen  
vehicle the garage burglary series (see  
CaseNo 120503436). Blake has a history of  
Vehicle Prowl, UPCS, and Assault.  
**INFORMATION ONLY - No PC**



- |   |   |
|---|---|
|  | CWA Predicted Location                  |
|  | Risk Field - Near Repeat Analysis w/CWA |
|  | Center (Average) of Activity            |
|  | Standard Deviation of Activity          |
|  | Bohrer Address                          |
|  | Rammed Events                           |
|  | Recovered (Related)                     |
|  | Stolen (Related)                        |

RESULTS ARE BASED ON KNOWN REPORTED CRIME. INCIDENTS NOT REPORTED MAY AFFECT THE ACCURACY OF THE RESULTS.

The standard deviation surrounds the center of the action (orange) contains approximately 70% of activity. Though there have been clusters of incidents outside the standard deviation, activity returns to areas near the center or average. The center or average is greatly influenced by suspect origin location (e.g. home). The suspect(s) have also returned to areas previously targeted and demonstrates both repeat and near-repeat patterns. The correlated walk analysis algorithm predicted an approximate location of the next incident (yellow exclamation mark). Note: Incidents not reported can greatly affect the validity of the result. It is unable to account environmental variables that make this an attractive target area. Although an area is defined, it still needs to be evaluated through an investigative lens.

# Types of Predictions

Large

Administrative

Reports (i.e.  
2013 calls for  
service)  
Broad-level focus

Strategic

Long-term trends

Crime type or place-  
based focus

Tactical

Crime Hot-spots

Pattern focused

Crime Series

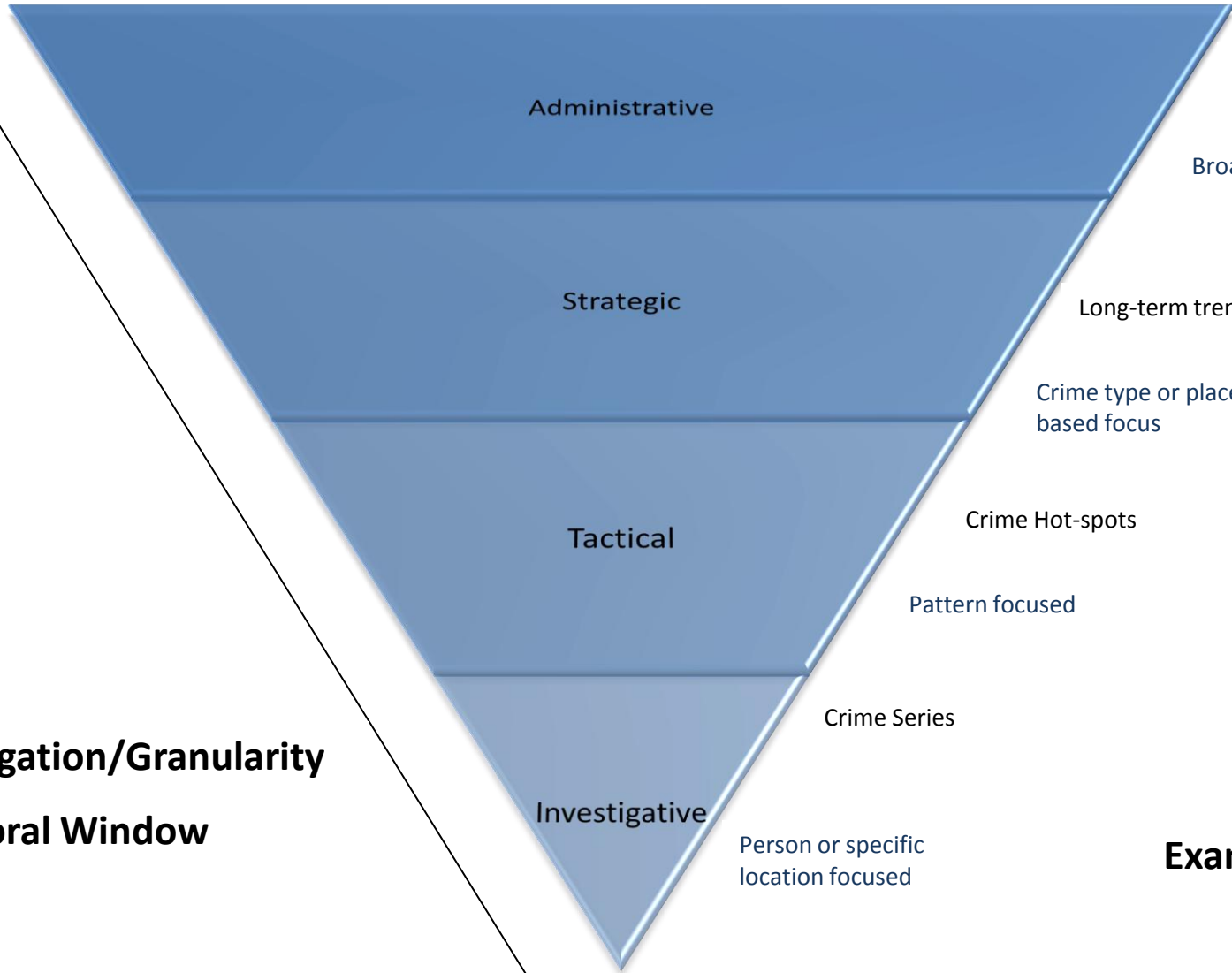
Investigative

Person or specific  
location focused

**Examples**

Small

**Level of Aggregation/Granularity**  
**Spatial/Temporal Window**





# Larger Space and Time Windows





# Smaller Space and Time Windows





# Forecasted Totals

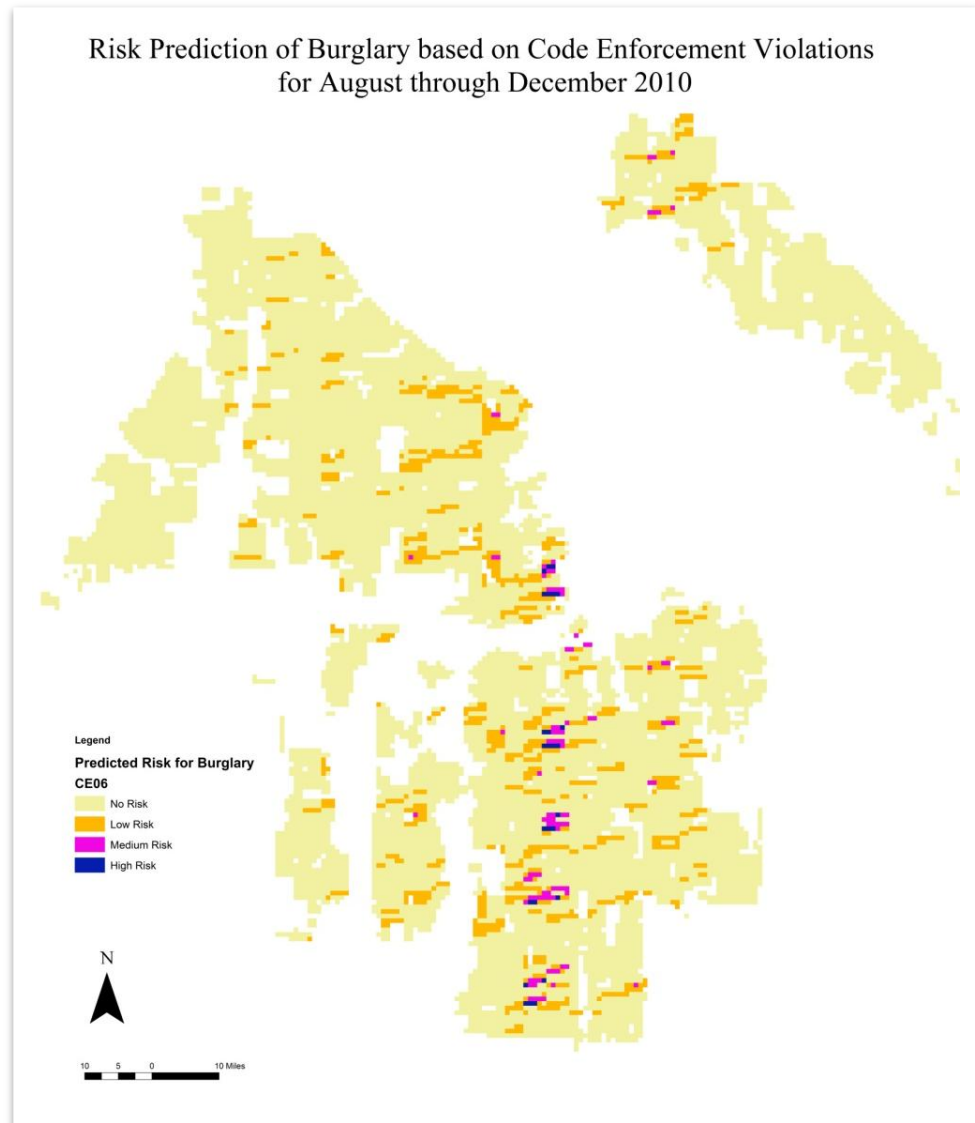
## PERFORMANCE MEASURE

|  | 2011  | 2012* | 2013 Target | 2014 Target |
|--|-------|-------|-------------|-------------|
| <b>Operations Bureau</b>   |       |       |             |             |
| Crimes Against Persons per 1,000 Residents                       | 23.9  | 26.5  | 25.1        | 25.1        |
| Crimes Against Property per 1,000 Residents                      | 99.9  | 112.1 | 106.2       | 105.6       |
| Average Emergency Response Time                                  | 4.0   | 4.0   | 4.0         | 4.0         |
| Calls for Service (Excluding Self-Initiated) per 1,000 Residents | 334.4 | 365.7 | 351.2       | 349         |
| Calls for Service (Self-Initiated) per 1,000 Residents           | 273.3 | 285.2 | 280.4       | 278.5       |

\*2012 includes actuals through August and projections for the remainder of 2012  
 City of Tacoma 2013-2014 Budget Work Session



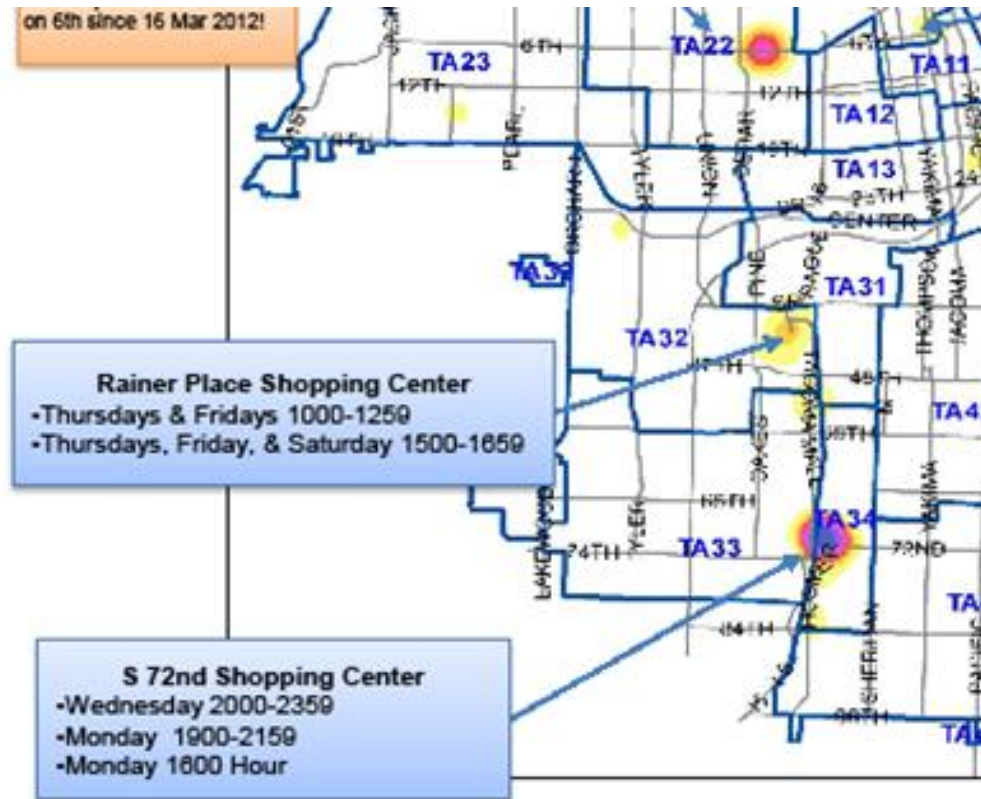
# Spatial Relationships







# Crime Patterns



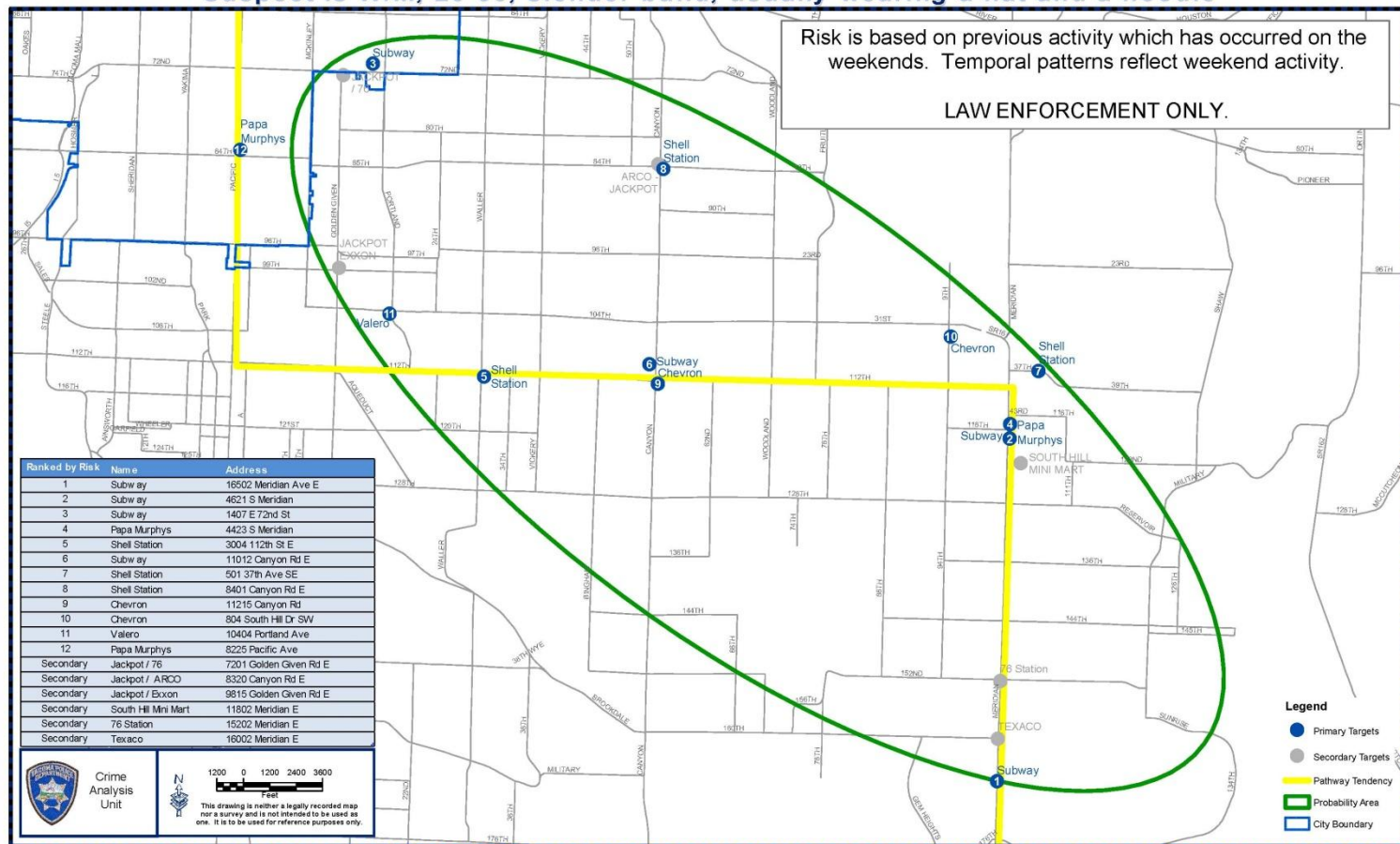
Created by TPD CAU on 12 Apr 2012





# Crime Series

## 11-222 Pizza & Sub Armed Robbery Series Suspect is W/M, 20-30, slender build, usually wearing a hat and a hoodie



PredPol Demo

# **TACTICAL PREDICTIONS**

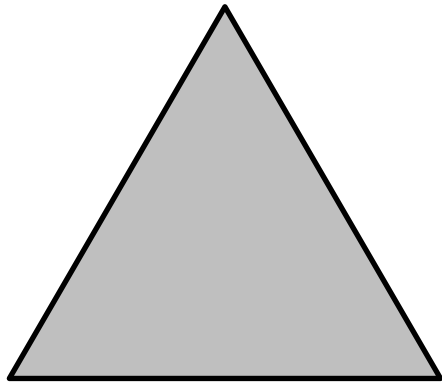
# PredPol is ...

- software technology that predicts the time and place of future crimes
- high level mathematics combined with experienced crime analysts and veteran police using their own knowledge and experience
  - more than “rear view mirror” policing that simply maps past crime



# the science

repeat victimization



near-repeats

local search



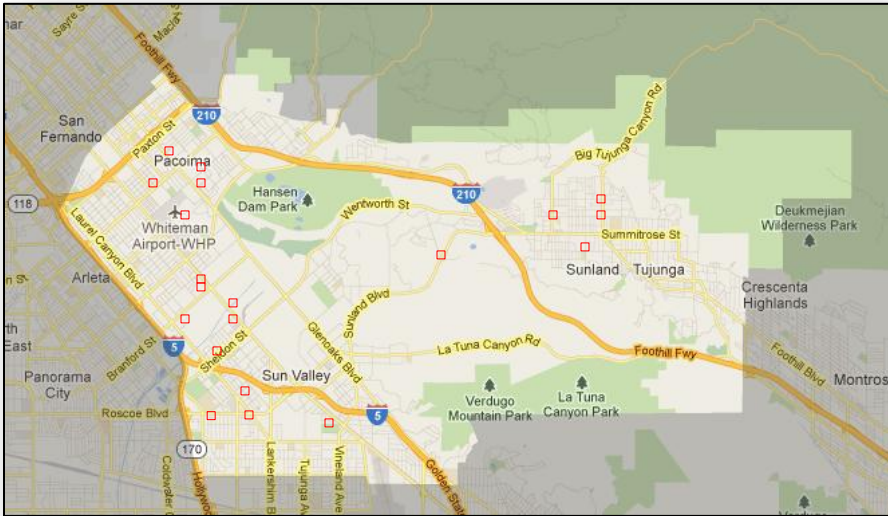
$$\frac{\partial B}{\partial t} = \frac{\eta D}{4} \nabla^2 B - \omega B + \theta \omega \delta$$

offender behavior

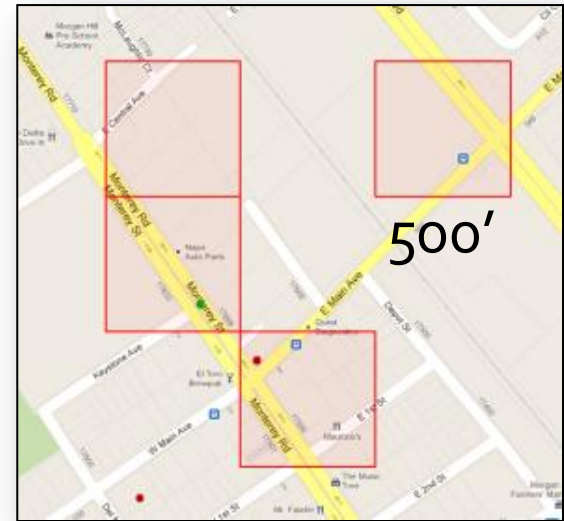
mathematical model

# deployment to officers in the field

- lists or maps of predictions in 500' x 500' boxes
- distributed at start of shift or on-demand
- 'get in the box' to disrupt crime during patrols



LAPD Deployment



Santa Cruz PD Deployment



# Disrupt Crime by...

- Detection
- Apprehension
- Prevention

# Crime Detection

A black and white photograph showing the silhouette of a person walking away from a house at night. The person is carrying a bag and is positioned in the center of the frame. The house has a porch with a door and windows. The scene is dimly lit, with the person's silhouette being the most prominent feature.

***Best chance for being at the  
right place at the right time***

# **Crime Apprehension**

***Even being near the right place,  
near the right time is beneficial***

One study found that when the first police car arrived within 4 minutes of a Burglary in Progress call, an arrest was twice as likely as when they arrived at 6 minutes

Arrest at the time of burglary is less time-consuming than detecting them after the offenders have left the crime scene

# Crime Prevention

**policing the risk =  
reducing the opportunity**

High Opportunity/Low Incentive

Low Opportunity/High Incentive

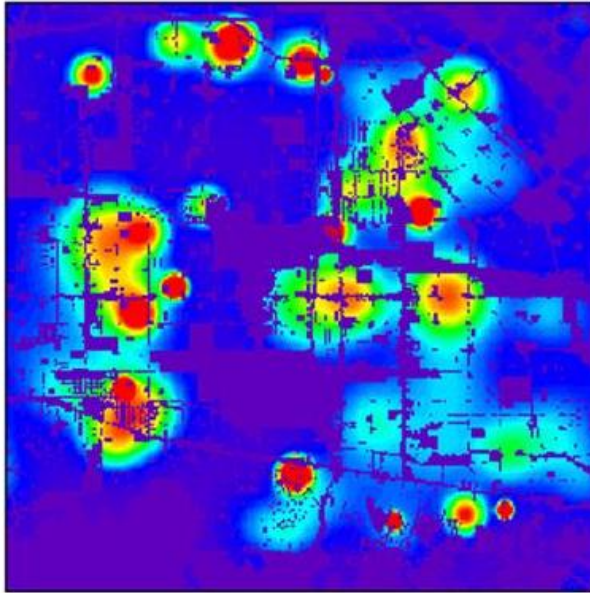
Bored Teens

Drug Addicts

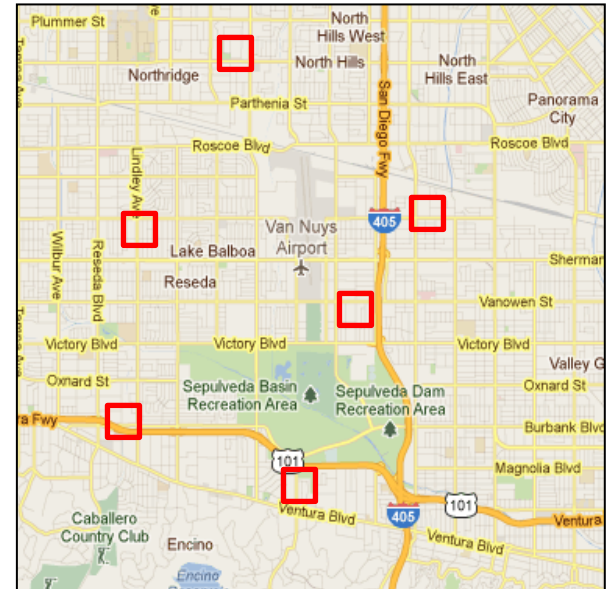
**“Opportunity makes the thief”**



# making predictive policing practical



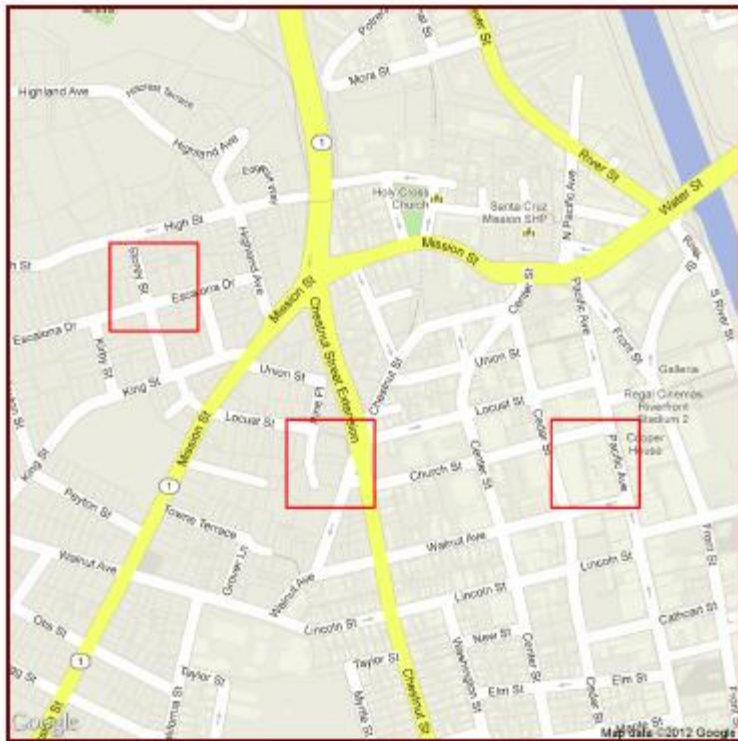
tactical ambiguity



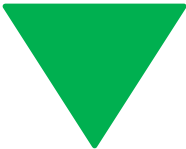
tactical clarity



# predictive policing in Santa Cruz, CA

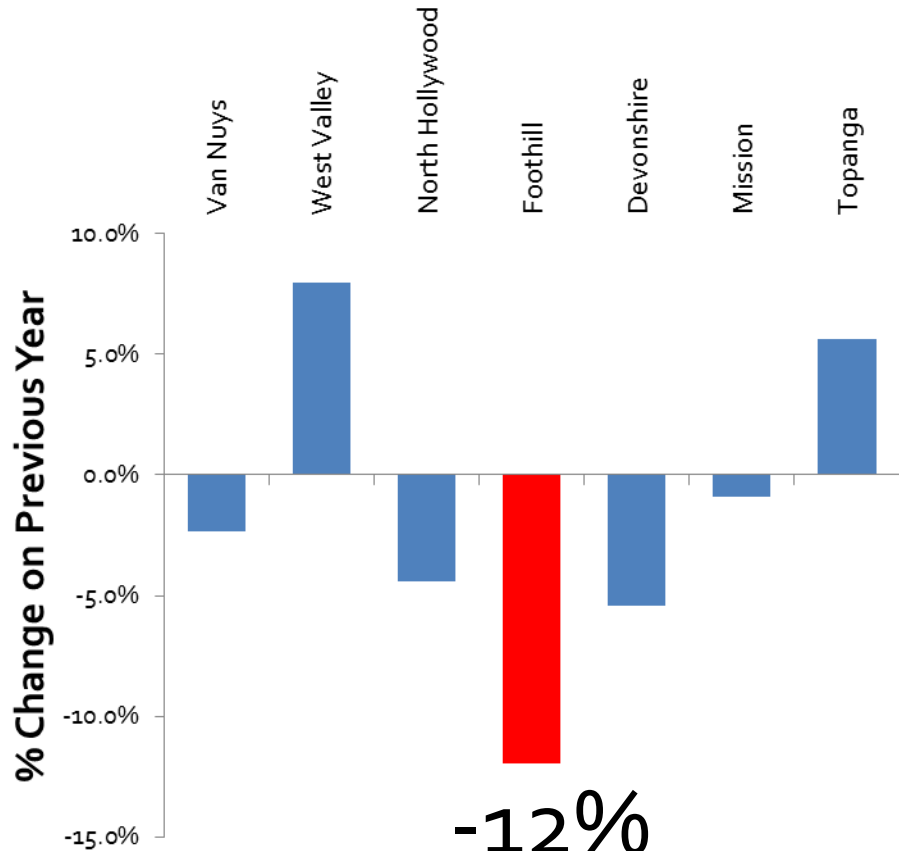


-19%



**Santa Cruz burglaries  
1<sup>st</sup> half 2011 vs. 1<sup>st</sup> half 2012**

# how do we know it worked in L.A.?

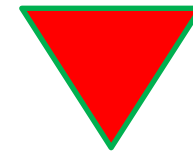


-12<sup>0</sup>%

**serious property crime  
all L.A. divisions**

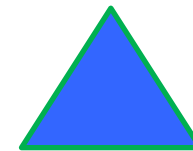
Nov '11 to May '12

-12<sup>0</sup>%



**L.A. Foothill Division**

+0.4<sup>0</sup>%



**Rest of L.A.**

# PredPol

- **is NOT:**
  - a replacement for knowledge, skills & experience
  - profiling of individuals
  - probable cause
  - new hardware or new hires
- **IS:**
  - assigning probabilities of crime in space and time
  - focal points for effective use of police resources
  - use of existing crime data

# TPD PrePol Offenses

## Selected Offenses

- Residential Burglary
- Commercial Burglary
- Vehicle Prowl
- MVTR
- Robbery

# 2006 Strategic Plan





# TCCS – Objectives

- Create a situational awareness of citywide crime activity, trends, and emerging issues (hard & soft crime)
- Identify effective crime fighting strategies, tactics, and resources to address those issues
- Ensure follow-up and assessment so that desired results are achieved and sustained, and successful strategies and tactics are replicated

<https://demo.predpol.com>